

## Module Specification

### Module Summary Information

<b>1</b>	<b>Module Title</b>	Biochemistry
<b>2</b>	<b>Module Credits</b>	20
<b>3</b>	<b>Module Level</b>	4
<b>4</b>	<b>Module Code</b>	BMS4000

<b>5</b>	<b>Module Overview</b>
<p><b>Rationale:</b></p> <p>Biochemistry is the study of the fundamental chemical and molecular reactions that occur within living organisms. The aim of this module is to introduce the biochemical reactions that occur within the human body, framed in the context of human health and disease.</p> <p>There are 5 broad themes in biochemistry that will be covered throughout the module:</p> <ol style="list-style-type: none"> <li>1. Properties of water, pH and buffers.</li> <li>2. Protein structure and function</li> <li>3. Nucleosides and nucleotides</li> <li>4. Carbohydrates and lipids</li> <li>5. Enzymes and Metabolism</li> </ol> <p><b>Alignment with Course Philosophy and Aims:</b></p> <p>This module aims to develop many skills befitting of a modern-day scientist and transferrable skills that many other employers' desire. You will participate in scholarly activity enabling the development of independent learning skills. Engaging in laboratory practical's, with associated pre- and post- directed learning, will develop your abilities in different forms of communication, investigation, critical thinking, rationalising and decision making.</p> <p>This module will deliver teaching in fundamental biochemistry, applicable to the study of human health and disease, along with key transferrable skills, such as problem solving, team work and interpersonal skills ; attributes that are attractive to a whole host of industries.</p> <p>The biochemistry module is truly interdisciplinary as it covers themes that are taught on other modules but from a different perspective. It also provides a foundation to learning and understanding more about concepts that you will study in other modules of this course.</p> <p><b>Learning and Teaching Strategy:</b></p> <p>A blended approach will be taken for learning and teaching purposes. You will benefit from a range of learning activities that will be supported by directed e-learning via the module MOODLE site. You will be expected to engage with the pre-session material, which will be discussed in the lecture. You will also be directed to post-session activities via the MOODLE site.</p>	

Face to face teaching will be conducted through interactive lectures, practical sessions and tutorials. You will be required to engage in the face-to-face sessions. Open questions will be asked requiring answers either verbally or through response ware in the form of mobile phones or clickers provided during the lecture. You may also work in allocated groups to complete little exercises before, during and after face-to-face sessions. Your engagement with the learning material can enhance skills such as communication and writing skills as well as developing confidence. Other interactive methods will also be utilised. The more you engage with the learning material the better will your learning journey be.

To achieve the required 20 credits for this module, you will need to dedicate at least 200 hours studying the module material. For this module, the time is broken down in an approximately 25:75 ratio (directed: self-directed). The scheduled learning activities will include lectures, tutorials, practical sessions and facilitated discussions; approximately 20% of this learning will take place in an online environment.

#### **Assessment Strategy:**

The assessment will be through a patchwork of multiple choice questions. The patchwork will consist of 3 separate mini classroom tests that will be invigilated. However, you will have access to a bank of questions beforehand from which a few will be selected for the actual mini test. Each mini test will be held after the completion of lectures of a particular theme. The questions will be designed to probe and assess whether you have demonstrated sufficient knowledge and appreciation of all concepts of biochemistry studied within the module.

6	Indicative Content
	<ol style="list-style-type: none"><li data-bbox="209 1207 1481 1406">1. In the first few lectures we will explore the building blocks of matter (atoms, elements and compounds) and how they are held together through chemical bonds. Oxidation and reduction reactions will also be looked at. We will discuss the special properties of water and its interaction with other molecules through hydrophilic and hydrophobic interactions and how these contribute towards production of biomolecules. The importance of pH in the context of buffers will also be discussed.</li><li data-bbox="209 1440 1481 1574">2. We will then explore biomolecules, starting off with the structure and properties of amino acids and how they are the building blocks of proteins. We will then look into how amino acids interact to form the convoluted folding structures found in proteins. In doing so, we will delve deeper into chemical bond interactions.  We will also look into the structure, function and diversity of the other major biomolecules such as carbohydrates and lipids and how these molecules play a role in cellular function.  We will finish biomolecules by discussing nucleotides and nucleosides and their role in DNA and RNA structure as well as energy transfer.</li><li data-bbox="209 1809 1481 1995">3. The third broad subject we will cover will be metabolism, starting off with the mediators of metabolism, enzymes. Themes that will be covered will be mechanism of catalysis, introduction to enzyme kinetics and effects of temperature and pH on enzyme structure and catalysis. We will also explore the principles of enzyme inhibition and how different types of inhibitors affect enzyme kinetics.</li></ol>

We will then explore how enzymes play a role in metabolism, notably in the production of ATP. In doing so, we will talk in some detail about the distinctive pathways, such as glycolysis, TCA cycle and oxidative phosphorylation.

<b>7</b>		<b>Module Learning Outcomes</b>
<b>On successful completion of the module, students will be able to:</b>		
	<b>1</b>	Identify the principles of chemical interactions and acid base balance.
	<b>2</b>	Describe the structure and function of biomolecules.
	<b>3</b>	Recognise the relationship between protein structure and function.
	<b>4</b>	Demonstrate understanding of the biochemistry of metabolism.

<b>8</b>		<b>Module Assessment</b>		
<b>Learning Outcome</b>				
		<b>Coursework</b>	<b>Exam</b>	<b>In-Person</b>
<b>1 – 4</b>			<b>X</b>	

<b>9</b>		<b>Breakdown Learning and Teaching Activities</b>	
<b>Learning Activities</b>		<b>Hours</b>	
<b>Scheduled Learning (SL)</b> includes lectures, practical classes and workshops, peer group learning, Graduate+, as specified in timetable		36	
<b>Directed Learning (DL)</b> includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning, as directed on VLE		124	
<b>Private Study (PS)</b> includes preparation for exams		40	
<b>Total Study Hours:</b>		200	